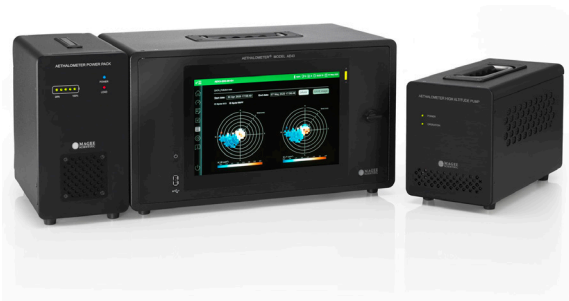
AETHALOMETER
MAGEE MODEL AE-43

The Model AE-43 is the brand new instrument for real-time black carbon monitoring. Rugged and light-weight, it is designed for portability and meet all laboratory and mobile monitoring requirements.

This model incorporates all Magee Scientific monitoring instruments features: accurate data, Dual-Spot patented technology, multi-wavelength analyse.

It also includes the most recent developments to extend applications to portable measurements.



BENEFITS

- "Full Spectrum" 7-Wavelength operation: UV – IR
- Light-weight design instrument for portability
- Real-time DualSpot™ Technology* compensates for sample spot "loading effects"
- Rugged and reliable instrument
- Simultaneous information about mass concentration and aerosol origins
- 1 Hz data at 7-Wavelengths

APPLICATIONS

- Portable measurements
- Vertical profiling
- Emission testings
- Health effect research
- Pollution mapping

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ORIGIN AND EFFECTS OF ELEMENTAL CARBON

Elementary Carbon - otherwise referred to as «black smoke» or «black carbon» according to the analysis methods - is generated by incomplete combustion and comes mainly from automobile exhaust, heating, thermal power plants and in general the combustion of fossil fuels and biomass.

Elemental carbon is a pollutant which has a doubly negative trait:
- It contributes to global warming and climate instability by absorbing light;
- Numerous epidemiological studies show that the correlation between health issues and the concentration of Elementary Carbon is higher than that of PM_{10} and $PM_{2.5}$ concentrations.

7 WAVELENGTH LIGHT SOURCE

The shorter the wavelength of the light source, the more the light absorption increases -for some chemicals such as aromatic hydrocarbons. This feature enables to assign a pollution episode to a particular transmitter. Several scientific contributions show that it is possible to assign some episodes to wood combustion rather than to traffic.

'DUAL SPOT' TECHNOLOGY

This new technology aims to overcome a common effect to all real time optical analysers that collect particles on a filter: the variation of the analyser's response according to the accumulated charge on the filter media. This effect, called 'spot loading' is variable and leads to a reduction of the analyser's response when the mass of aerosol deposited on the filter increases. When the attenuation of light radiation exceeds the limit of maximum attenuation, the filter tape advances and displays a blank area.

Ideally, the measured Elemental Carbon concentration value should be identical to that obtained in the previous filtering area, but experience shows that the new value of concentration is generally higher. This effect is essentially variable and depends on many parameters such as geographic location, season, and etc.

BLACK CARBON ANALYSER ON 7 WAVELENGTHS

MAGEE AETHALOMETER AE-43

Dual Spot' technology eliminates the filter's undesirable effect. It consists in analysing the Elemental Carbon by taking the same aerosol sample on 2 parallel filter tapes. These two filter tapes collect aerosols at a different rate which allows measurement of the same aerosol concentration at two different attenuation values. This method is applied to the seven wavelengths and helps calculate a correction factor.

ZERO AND AUTOMATIC GAIN

The AE-43 offers the possibility to automatically check the zero by means of an internal filter. A set of glass elements with varying light absorption factors, calibrated by comparison with standards, ensures the checking of the response and the stability of the photo-detectors.

MODULAR CONSTRUCTION

Different subsets are easily removable for routine maintenance.
The measuring cell is mounted on a bayonet connector to be easily disassembled for cleaning.

INTERFACES

The AE-43 is equipped with the following interfaces:
- 25,7 cm colour touch screen
- USB port for transferring stored data
- USB port for installing a keyboard for easy initial setup
- RS232 port
- Ethernet port for data transfer, diagnostics and remote control

BLACK CARBON ANALYSER ON 7 WAVELENGTHS

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TECHNICAL SPECIFICATIONS

TECHNOLOGY	Dual Spot
INTERNAL VACUUM PUMP	Dual diaphragm, brushless motor
RESOLUTION	0.001 µg/m³ or 1 ng/m³ (user-definable display units)
DETECTION LIMIT (1 HOUR)	< 0.005 µg/m³
RANGE	< 0,01 to > 100 µg/m³ Black Carbon
MEASUREMENT TIME BASE	1 second or 1 min (user selectable), resampling to any time resolution possible
DÉBIT	Programmable de 2 à 5 l/min, régulation électronique
POWER SUPPLY AND CONSUMPTION	100-230VAC, 50/60 Hz, 25W Optional external battery
DIMENSIONS (HXWXD)	22 x 40 x 23 cm
WEIGHT	11,5 kg
INTERFACES	- 25,7 cm colour touch screen - USB port for transferring stored data - USB port for installing a keyboard for easy initial setup - RS232 port - Ethernet port for data transfer, diagnostics and remote control

ECOMESURE

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